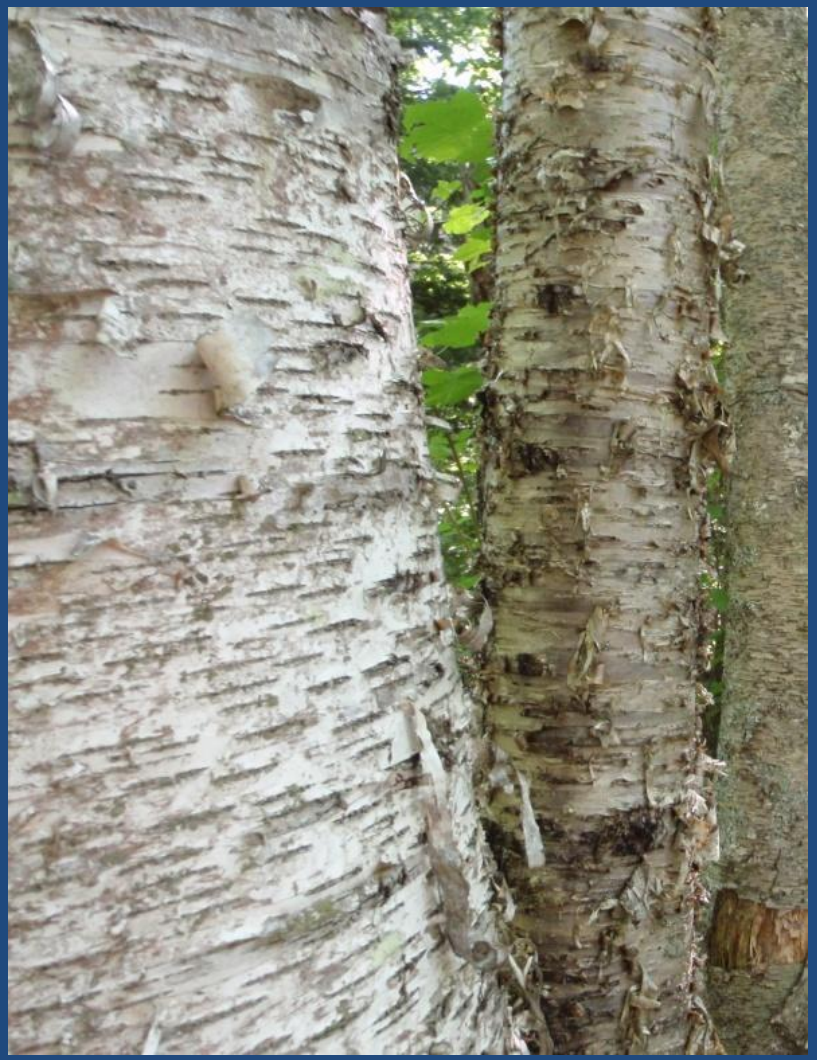
Where Will the Eagles Nest? Results of Forest Monitoring at the Mississippi NRRA

Suzanne Sanders and Jessica Grochowski
Great Lakes Inventory & Monitoring Network


Grand Portage
National Monument
Voyageurs National Park
Isle Royale National Park
Apostle Islands National Lakeshore
Pictured Rocks
National Lakeshore
Saint Croix National
Scenic Riverway
Sleeping Bear Dunes
National Lakeshore
Mississippi National River
and Recreation Area
Indiana Dunes National Lakeshore
N

Primary Monitoring Questions

- How are populations of key species changing?
- How are plant communities changing?
- How is plant community structure changing?



Secondary Monitoring Questions

How is deer browse impacting park forests?

How are diseases impacting park forests?

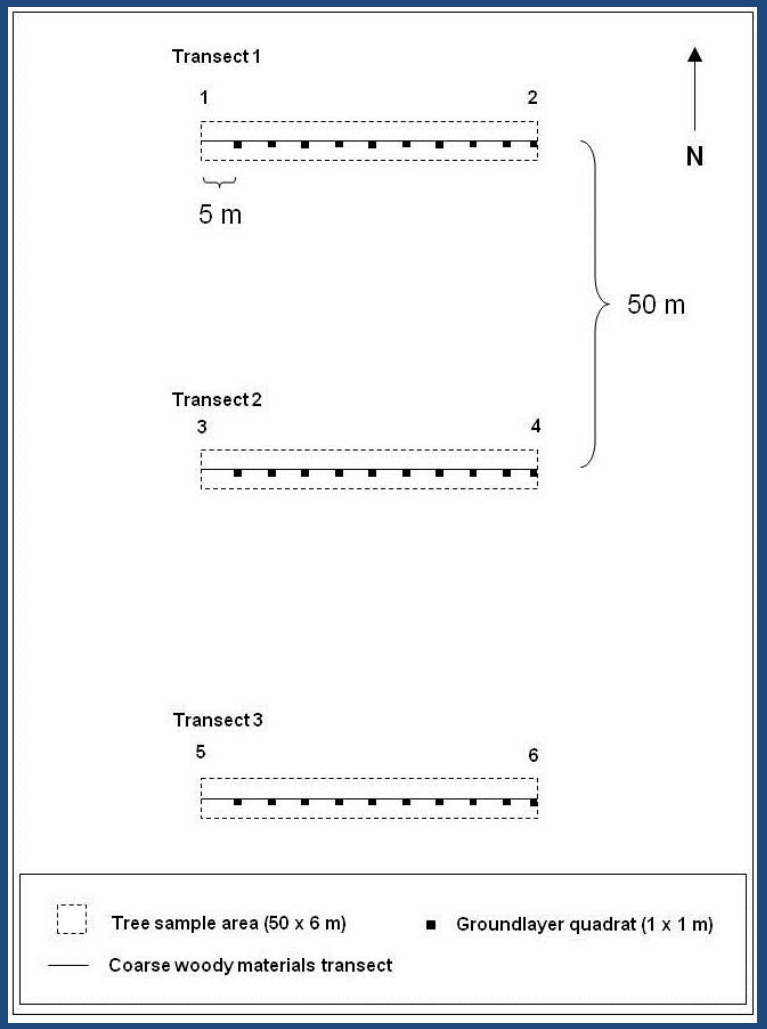
What are the successional projections for park forests?

Sampling Rotation

Park	Year										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Indiana Dunes NL	X					X					
Grand Portage NM	X						X				
St. Croix NSR	X						X				
Voyageurs NP		X						X			
Sleeping Bear Dunes NL			X						X		
Pictured Rocks NL			X						X		
Isle Royale NP				X						X	
Mississippi NRRA					X						X
Apostle Islands NL					X						X

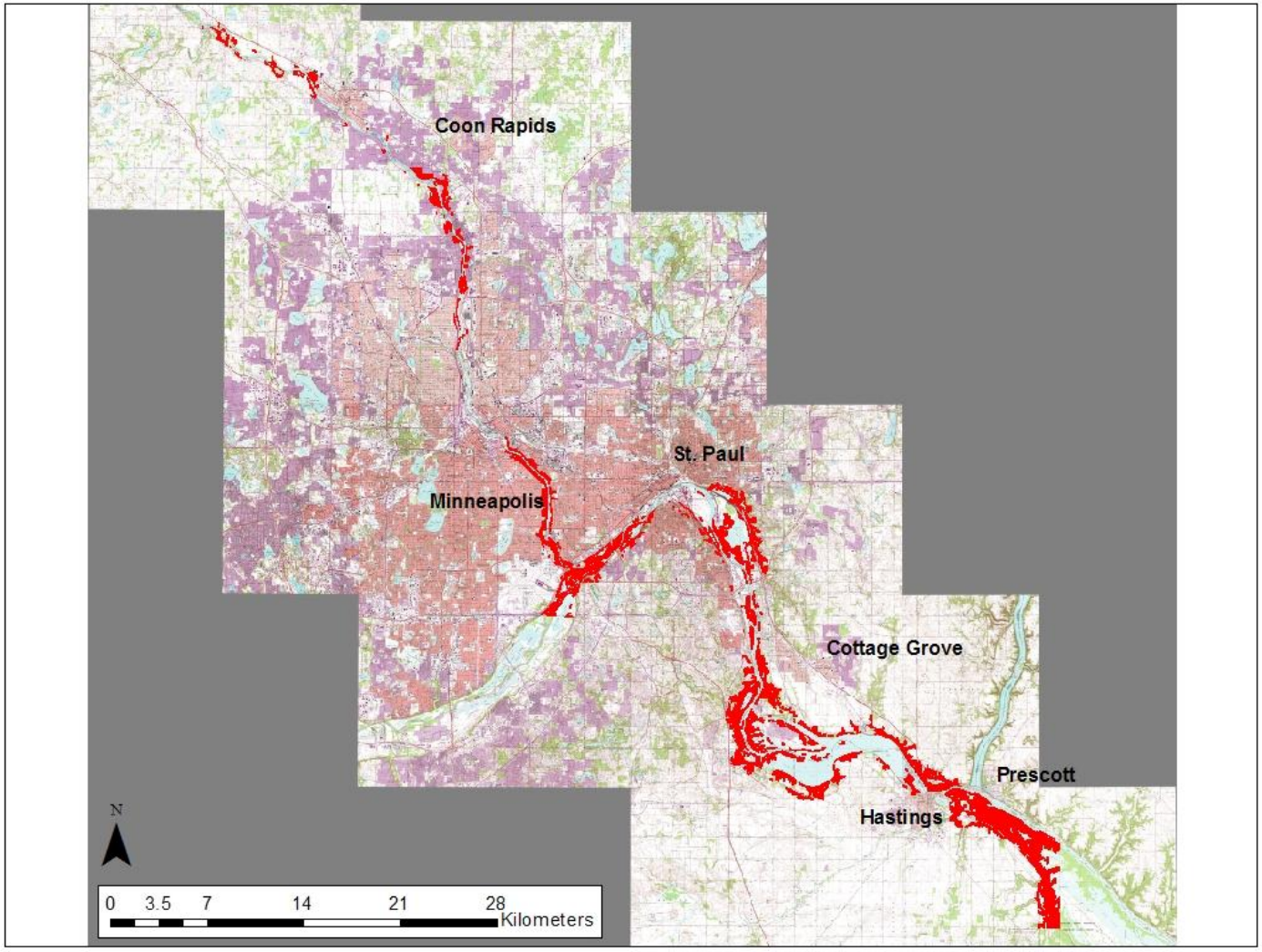
Sampling Plot

- Trees in three 6 x 50 m transects
- Groundlayer in thirty 1 m^2 quads
- DWM along three 50 m transects

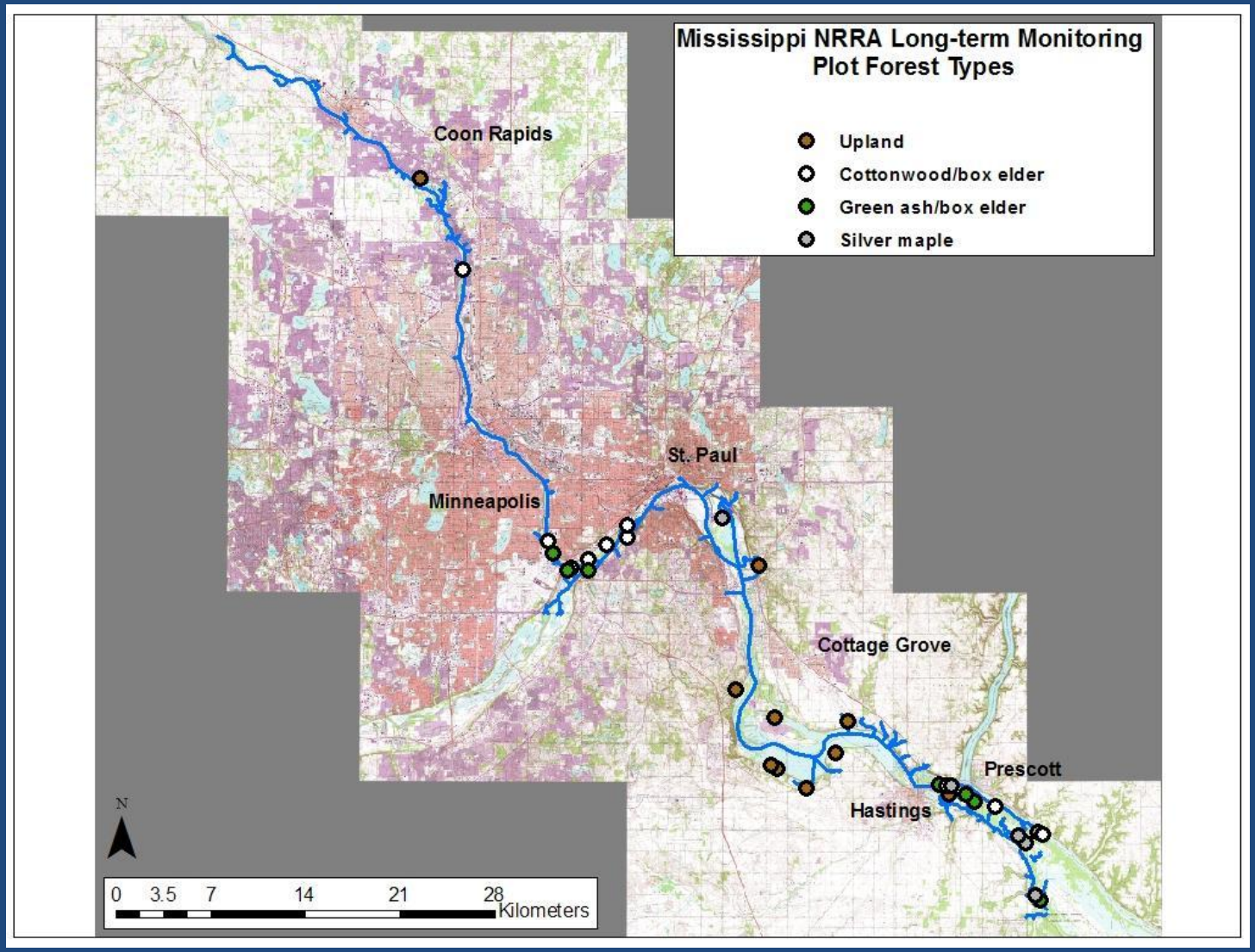


Mississippi NRRA

Mississippi NRRA



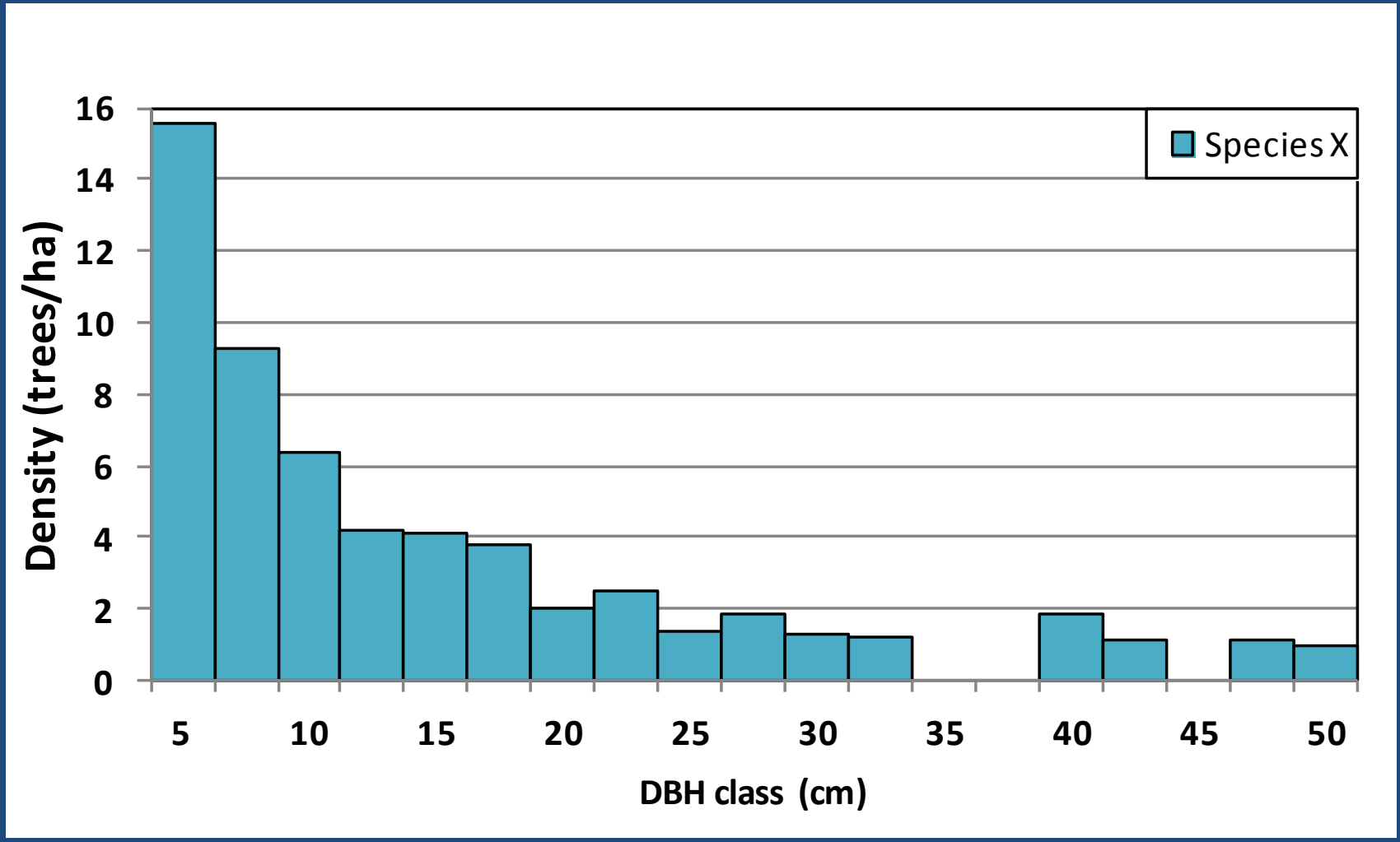
Plots Established



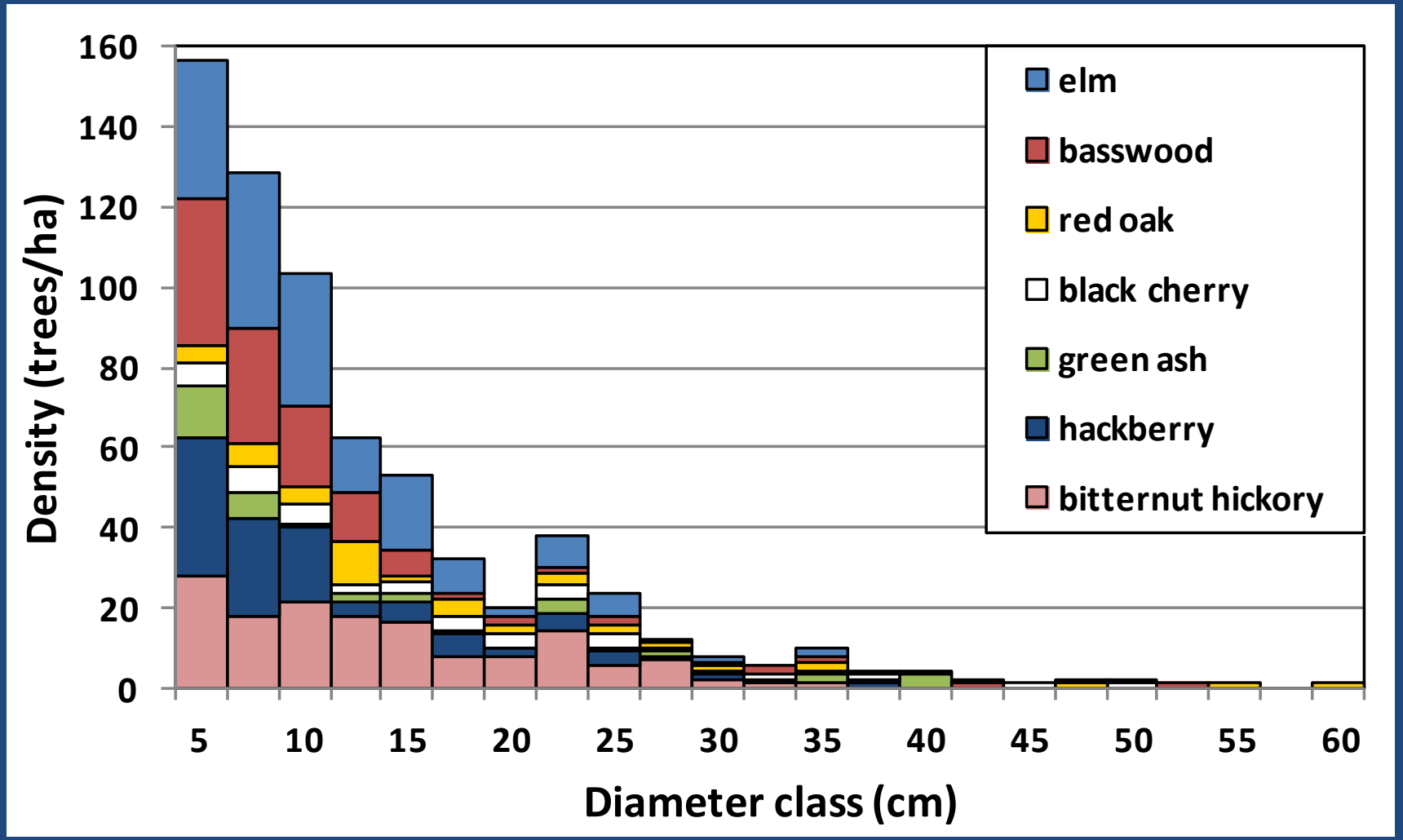
What We Found

- 38 tree species
- 43 species of shrubs woody vines
- 167 herbaceous species

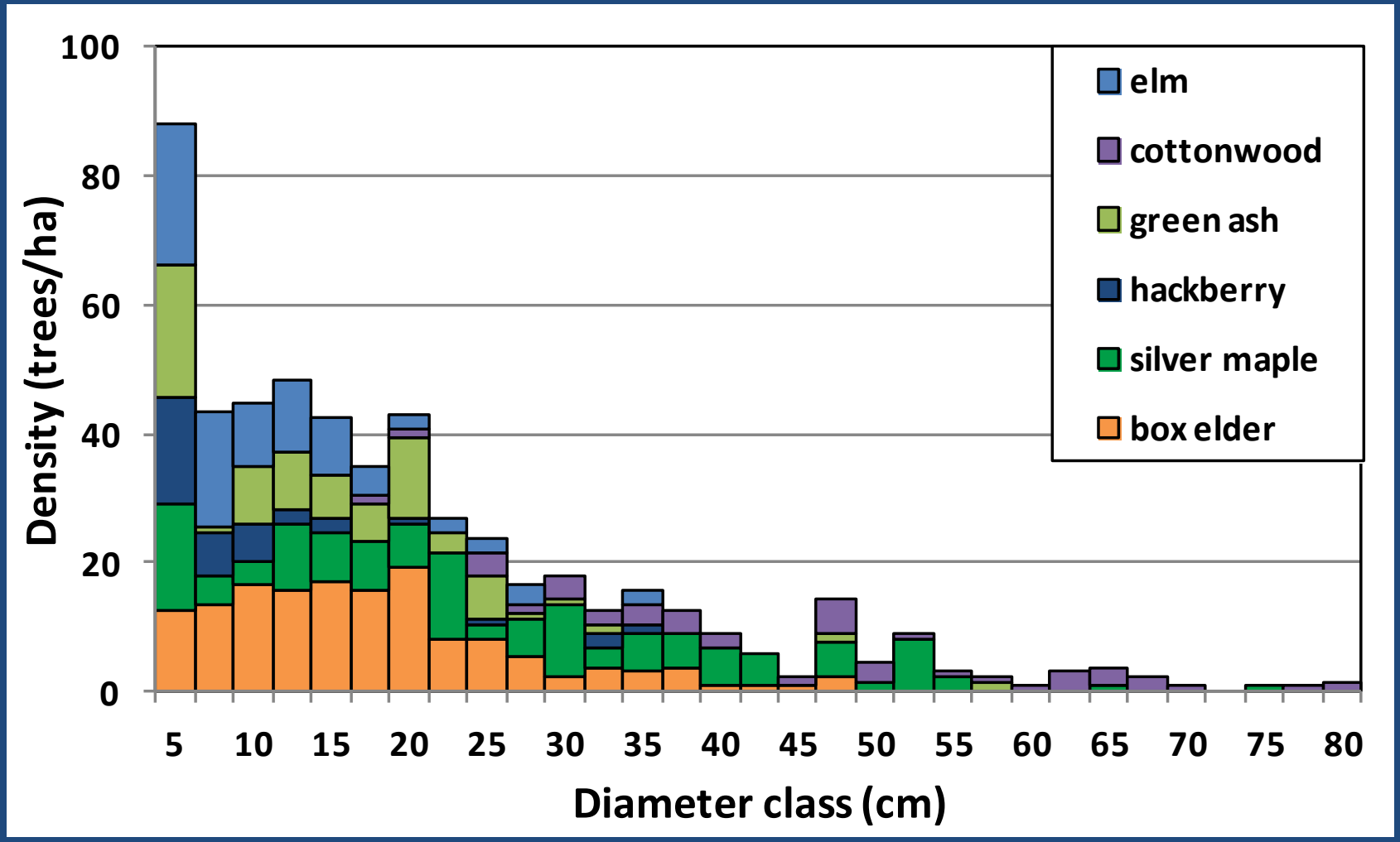
Successful Regeneration



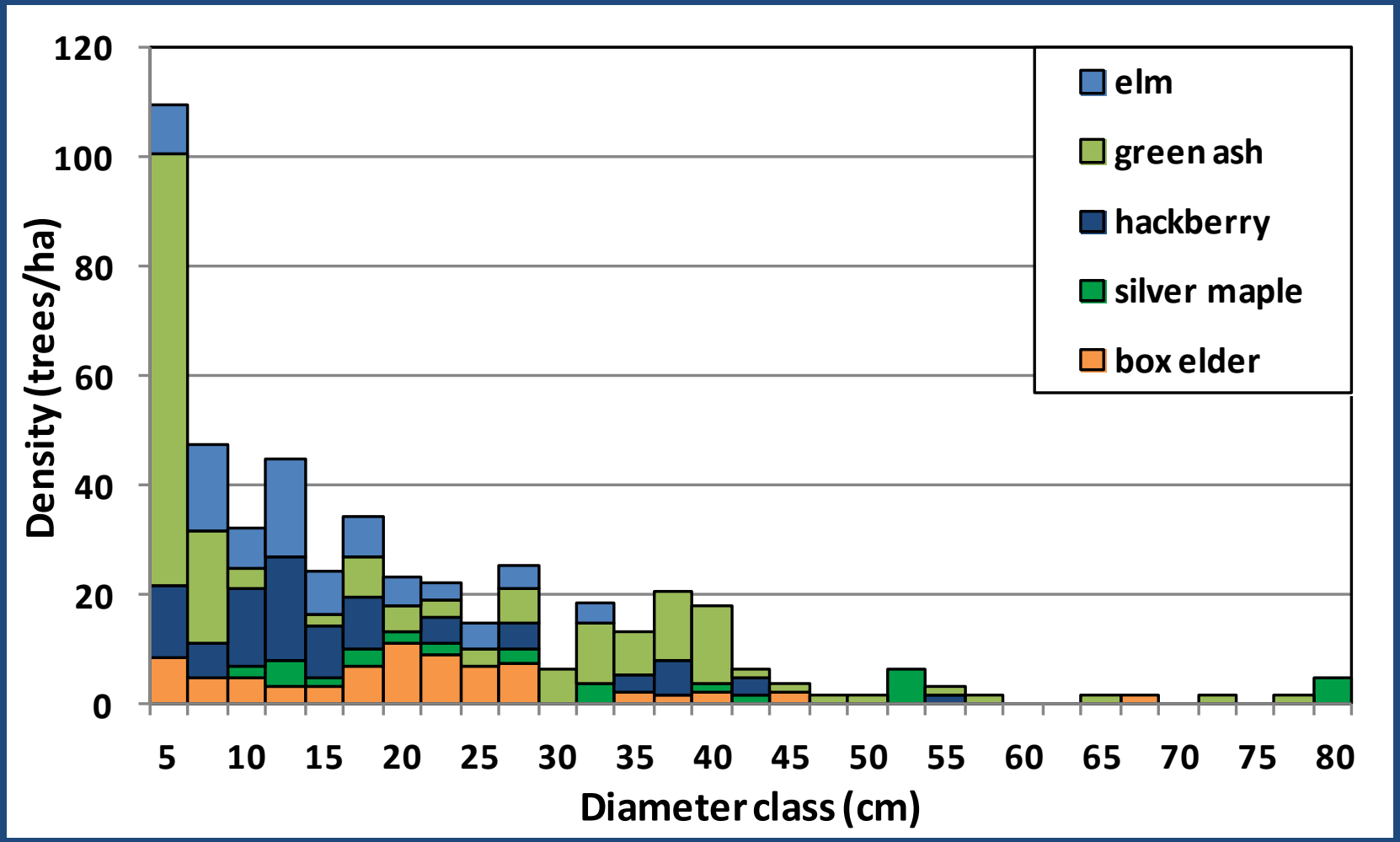
Upland


160
140
120
100
80
60
40
20
0
Density (trees/ha)
5
10
15
20
25
30
35
40
45
50
55
60
Diameter class (cm)
elm
basswood
red oak
black cherry
green ash
hackberry
bitternut hickory

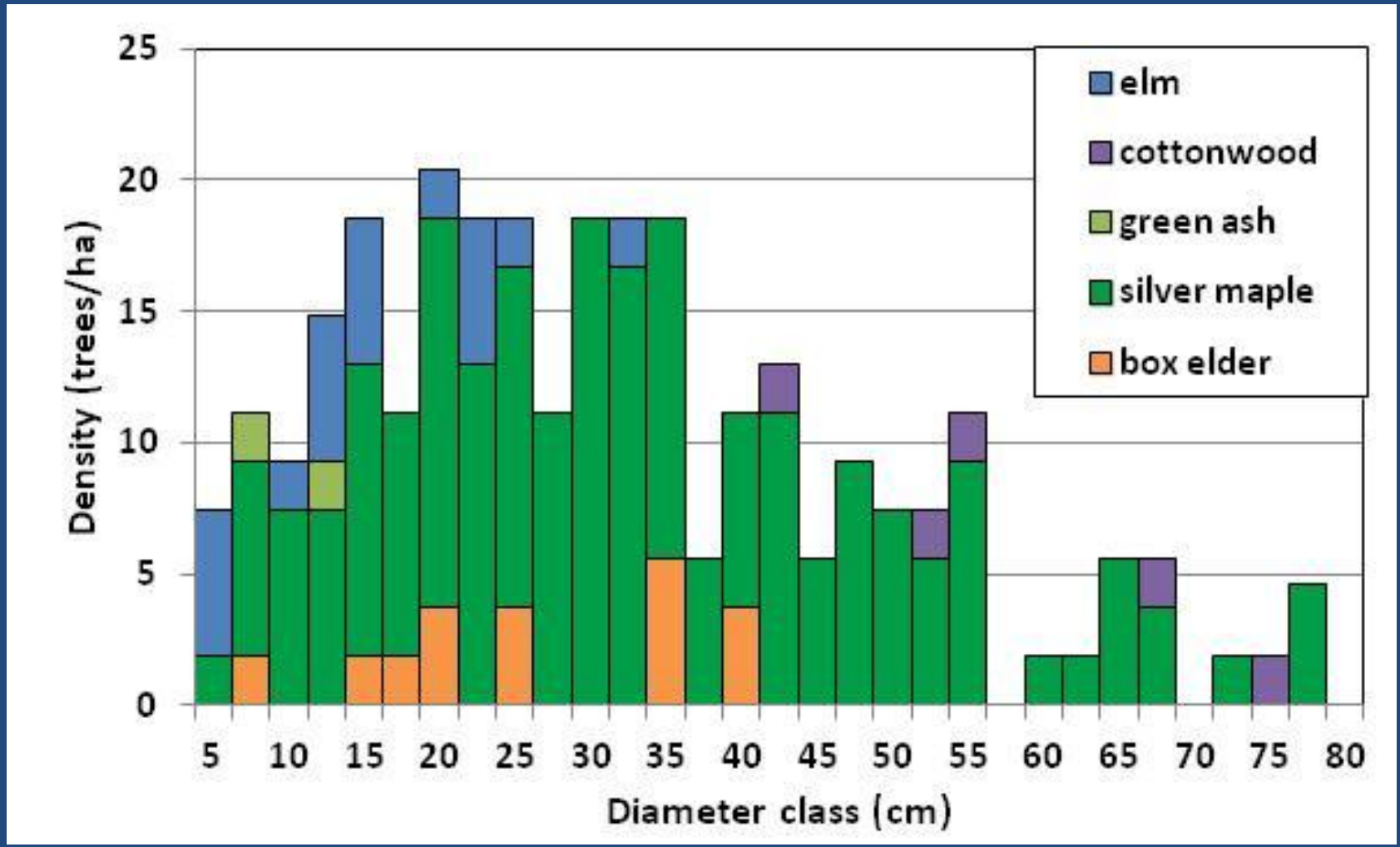
Cottonwood-Box Elder Forests



Green Ash-Box Elder Forests



Silver Maple Forests



Floodplains at MNRRA

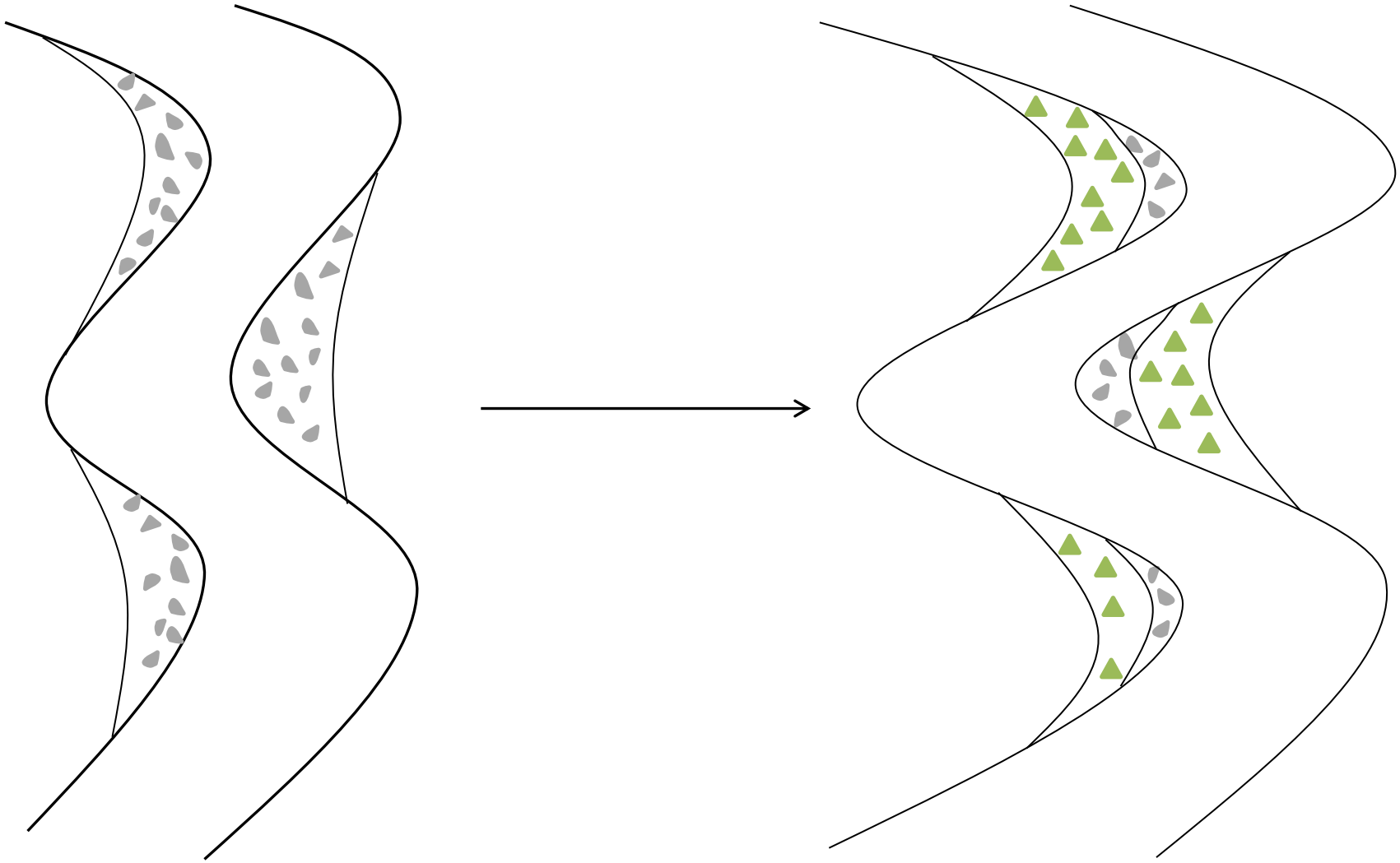
- Loss of floodplain characteristic species
- Succession to more upland tree species
  - decoupling trees with river processes
- Floodplain:
  - act as filter
  - stabilize soil
  - contribute to aquatic food webs
  - provide wildlife habitat
- River
  - provides nutrients to the trees
  - aids recruitment

Floodplain Plots at MNRRA

Why No Regeneration?

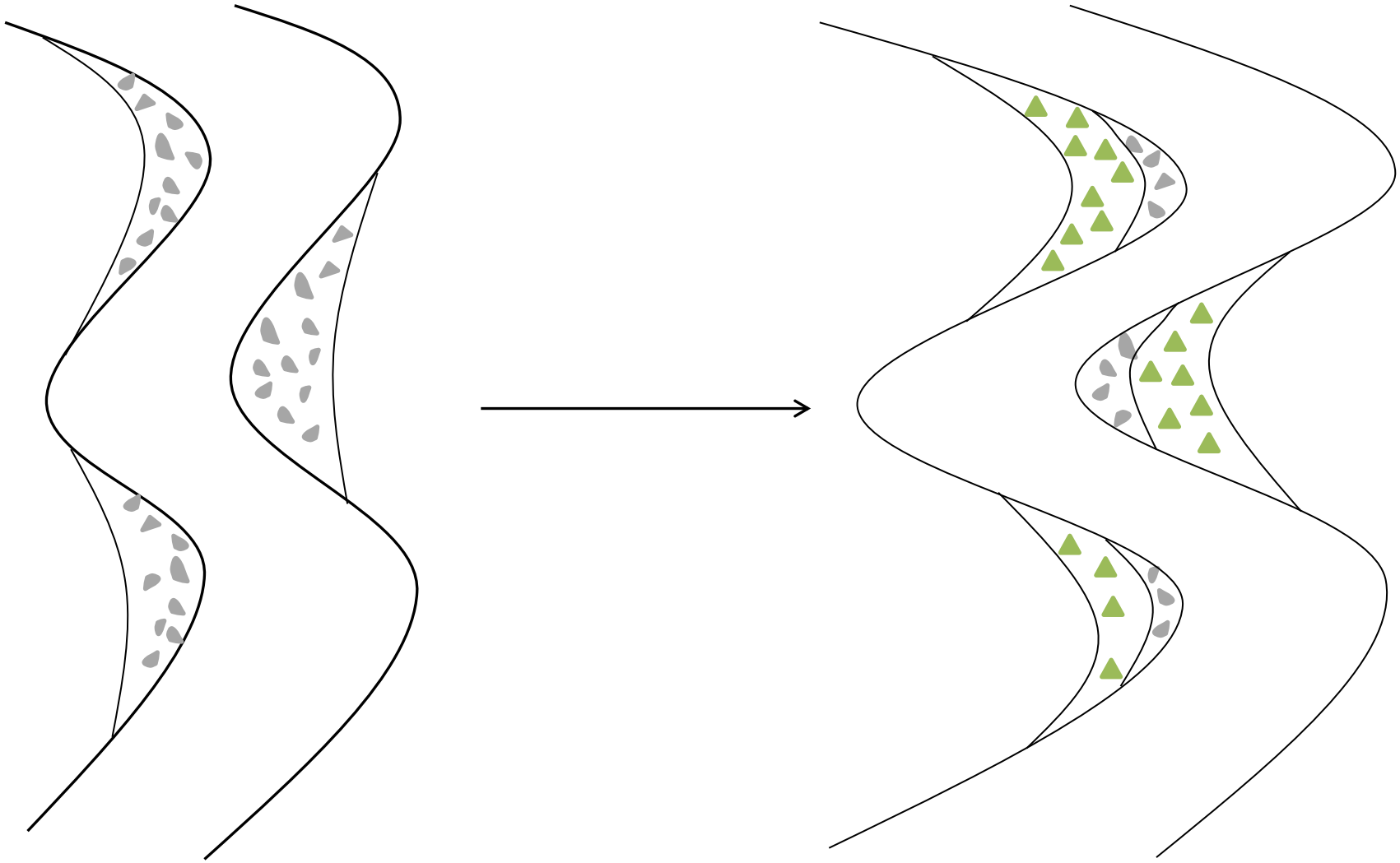
- River is largely channelized
- Dams

River Channel Dynamics



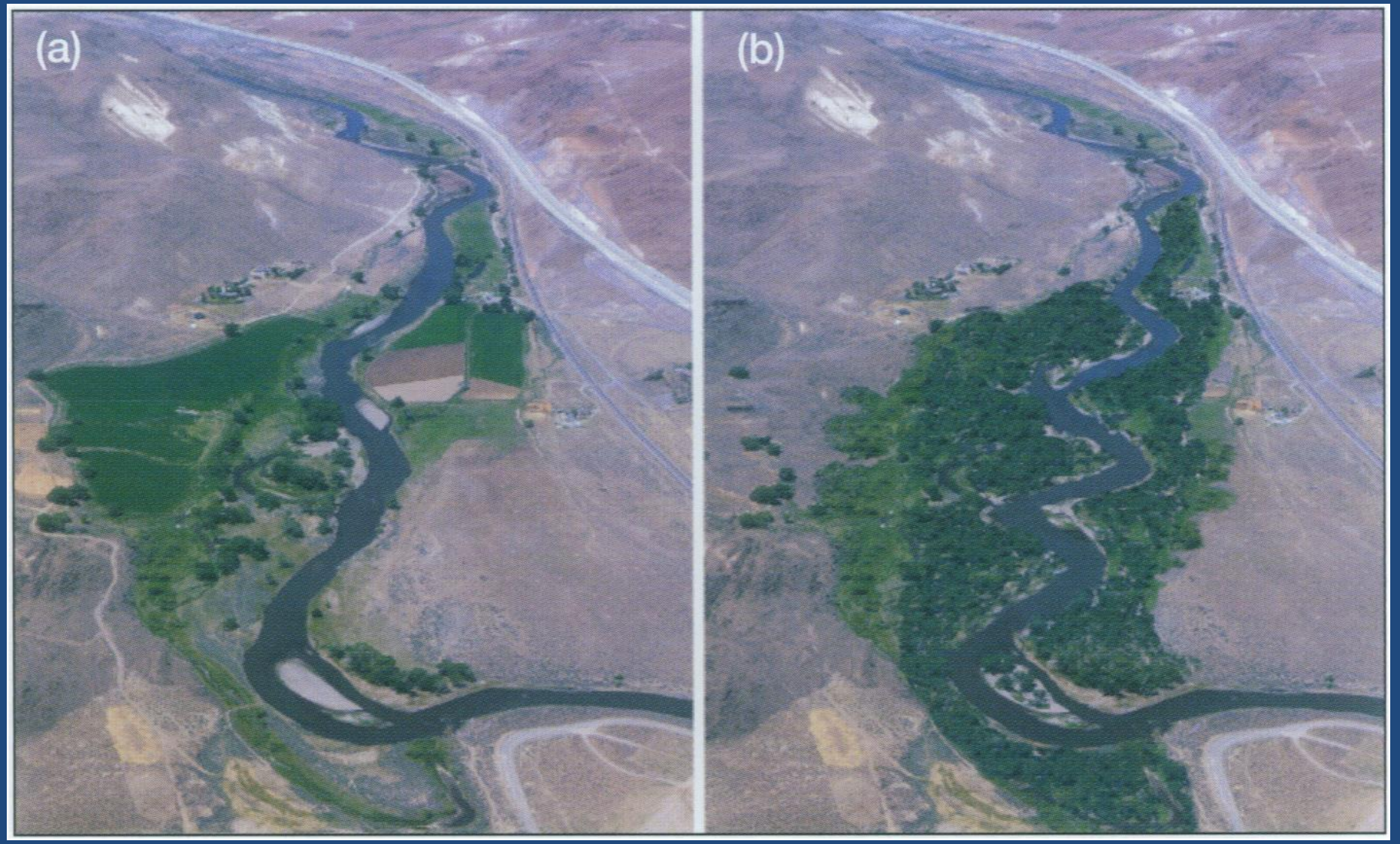
Kalischik et al. 2001

River Channel Dynamics



Rood and Mahoney 2000

Photo by S. Rood; Stettler et al. 1996



Rood et al. 2005

Dams

- moderate high flow events

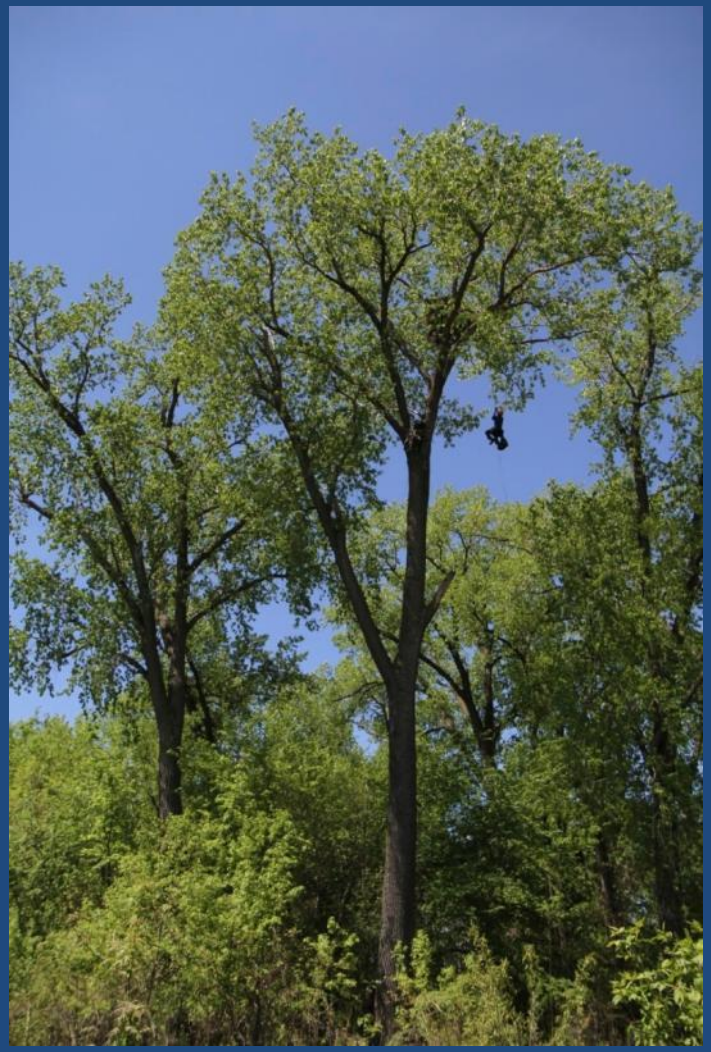
- supplement low flows

Cottonwood Regeneration

- Needs flooding to scour ground and create nurse sites (pre-seed release)
- Very slow drawdown of water (post-germination)
- Little/no ice scour in the following two springs
- Little/no anoxia in the following two springs

Floodplains and Wildlife

- Red shouldered hawks
- Cerulean warblers
- Prothonotory warblers
- Eagles preferentially use cottonwoods



Regional Recovery Tactics

- SD-GFP: 4:1 replacement ratio (plant four seedlings for every mature tree on SD-GFP lands)

- Missouri River Recovery Plan: No more than 10% of cottonwood forest habitat suitable for eagles is lost over the project duration

Where Do *We* Go From Here?

- Pool drawdowns
  - Pool 8 (2001 and 2002)
  - Pool 5 (2005 and 2006)
  - Pool 6 (2010)
  - Pool 3 ?

- Restoration
  - feasibility study
  - seedlings vs. cuttings
  - target locations


CH 9849

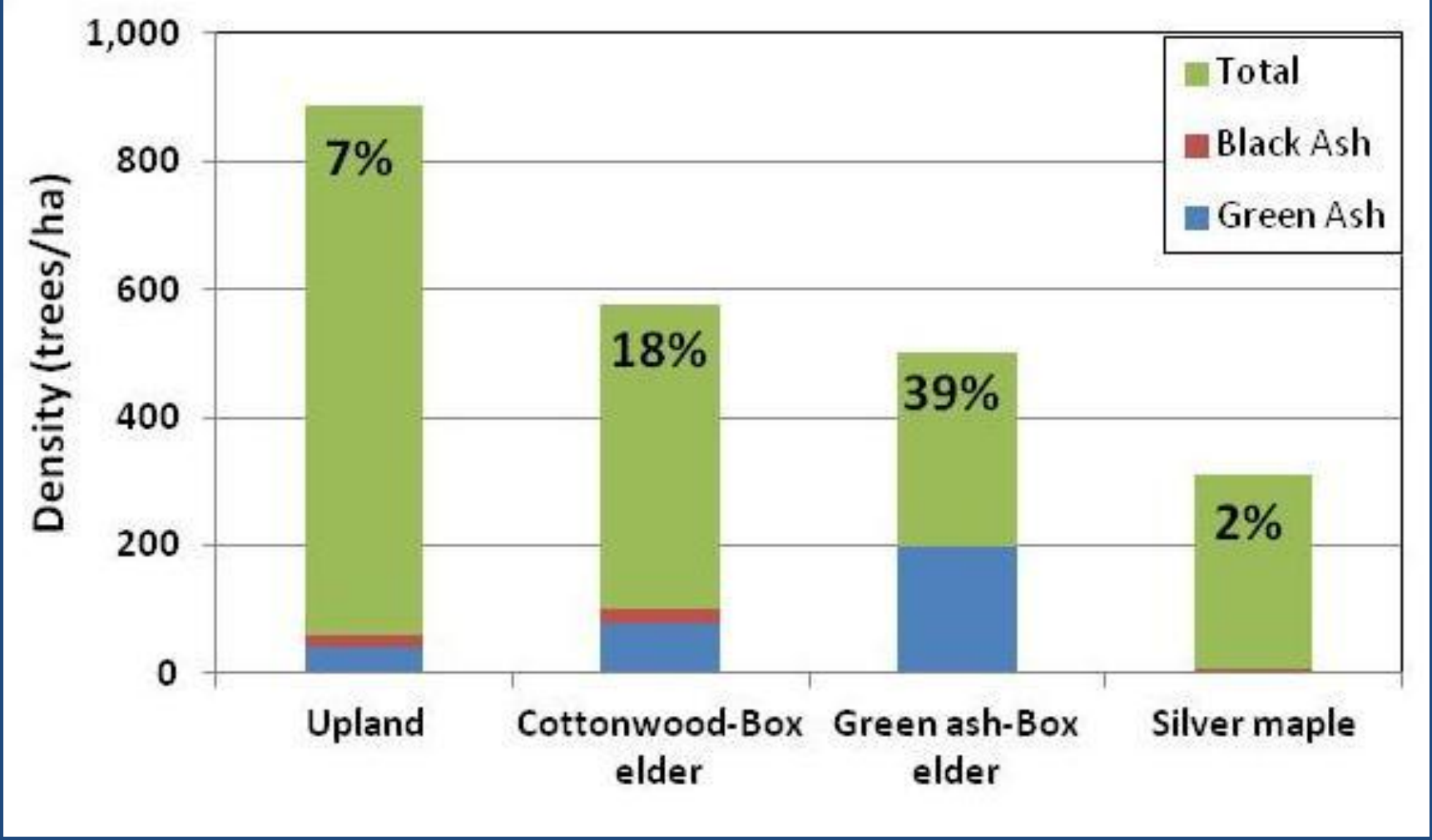
Emerald Ash Borer

- Native to Asia
- Discovered near Detroit in 2002
- Feed underneath bark
- Lethal

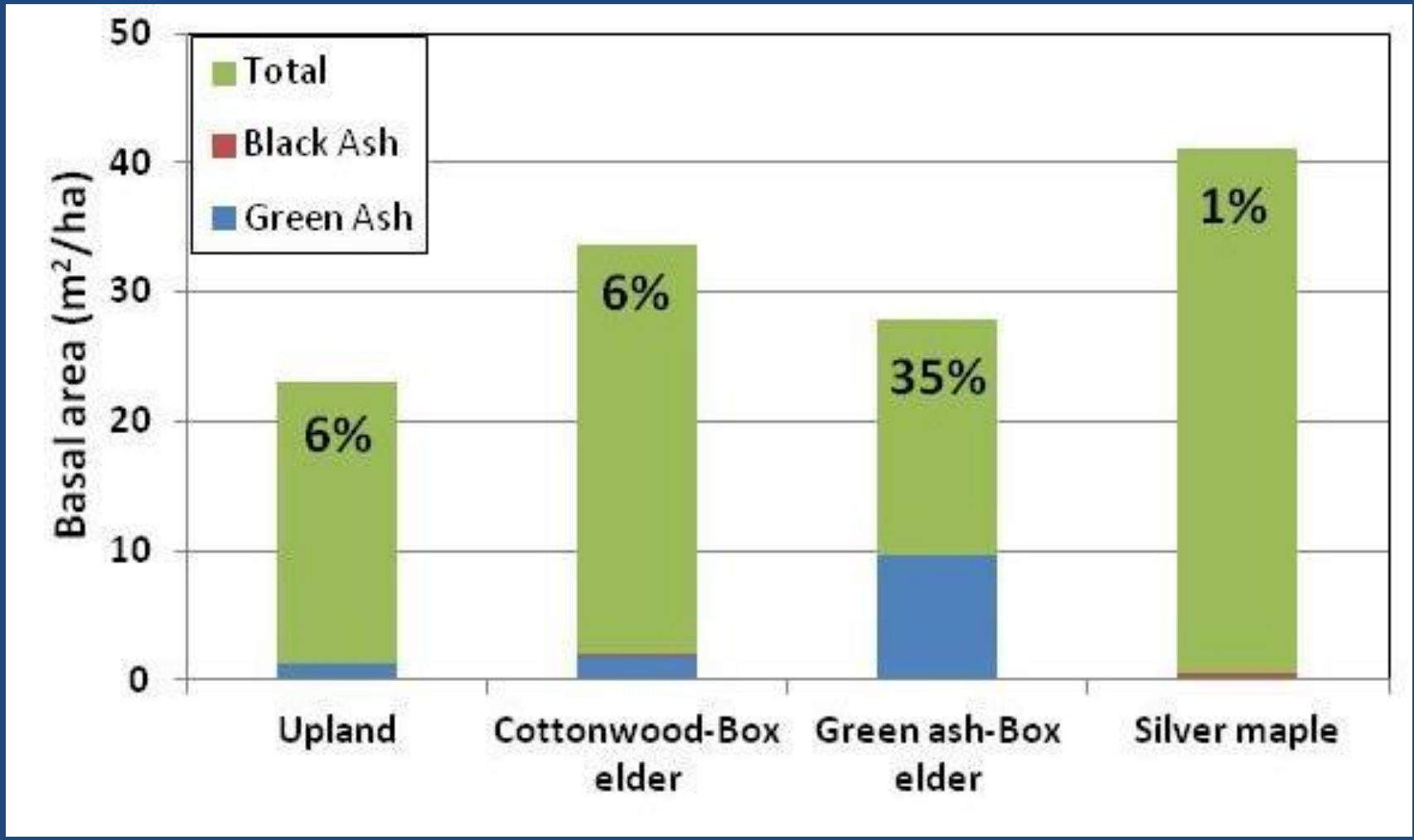
Emerald Ash Borer

- Identified by D-shaped exit holes
- First discovered in St. Paul in the St. Anthony neighborhood in 2009

Ash Density


1,000
800
600
400
200
0
Density (trees/ha)
Total
Black Ash
Green Ash
7%
18%
39%
2%
Upland
Cottonwood-Box elder
Green ash-Box elder
Silver maple

Ash Basal Area



Elm Identification Problems

American elm
Ulmus americana

slippery elm
Ulmus rubra